

Patent Claims

1. An apparatus for reducing the current drawn during starting of a single-phase AC asynchronous motor (M), having an auxiliary winding (3) and having a main winding (4), which apparatus has an NTC thermistor (5) which can be connected in series with the main winding (4), characterized in that the NTC thermistor (5) can effectively be connected in series with the main winding at the start of the switching-on process in order to limit the starting current through the main winding (4), and with the NTC thermistor (5) not limiting the current through the auxiliary winding (3).
2. The apparatus as claimed in claim 1, characterized in that a starting circuit (8, 9) with a starting capacitor (8) for producing a phase shift in the auxiliary winding (3) is arranged such that it can be connected in series with the auxiliary winding (3), and in that a PTC thermistor (9) for limiting capacitive current surges through the starting capacitor (8) is provided in series with the capacitor (8).
3. The apparatus as claimed in claim 1, characterized in that a starting circuit (8, 9') with a starting capacitor (8) for producing a phase shift in the auxiliary winding (3) is arranged such that it can be connected in series with the auxiliary winding (3), and in that an NTC thermistor (9') for limiting capacitive current surges through the starting capacitor (8) is provided in series with the capacitor (8).
4. The apparatus as claimed in one of claims 1 to 3, characterized in that a switch (6) is provided in order to

bridge the NTC thermistor (5) after completion of the starting process.

5. The apparatus as claimed in one or more of claims 1 to 4, characterized in that a switch (10) is provided in order to switch off the starting circuit (8, 9) or (8, 9').
6. The apparatus as claimed in one or more of the preceding claims, characterized by a control arrangement (11) for switching the switches (6 and 10) on and off as a function of time.
7. The apparatus as claimed in one or more of the preceding claims, characterized in that the control arrangement (11) is designed such that the switch (10) can be operated before the switch (6).
8. The apparatus as claimed in one of the preceding claims, having an operating capacitor (7) for producing a phase shift in the auxiliary winding (3) with respect to the main winding (4) in the operating state, characterized in that the capacitance of the starting capacitor (8) is of such a magnitude that its capacitance value is greater than the capacitance value of the operating capacitor (7).
9. The apparatus as claimed in one or more of claims 2 to 8, characterized in that the capacitance value of the starting capacitor (8) is at least twice and preferably three to five times as great as the capacitance value of the operating capacitor (7).
10. The apparatus as claimed in one or more of the preceding claims, characterized in that the NTC thermistor (5) has a cold resistance of 10 to 30 Ω .

11. A method for reducing the starting current on switching on a single-phase AC asynchronous motor (M), characterized in that, on switching on, the current through the main winding of the motor is reduced by means of an NTC thermistor (5), and in that the NTC thermistor (5) is bridged by means of a switch (6) after starting of the motor, preferably on or after reaching rated operation.
12. The method as claimed in claim 11, characterized in that a starting capacitor (8) produces a starting phase shift in the auxiliary winding (3) of the motor during the starting process, and in that a resistor (9, 9') reduces the current through the starting capacitor (8) at the moment of being switched on.
13. The method as claimed in claim 12, characterized in that the resistor (9, 9') and the starting capacitor (8) are disconnected from the circuit by means of a switch (10) on reaching rated operation, before the NTC thermistor (5) is bridged by means of the switch (6).
14. The method as claimed in one or more of the preceding claims, characterized in that the current through the main winding (4) is increased continuously during the starting process, while the current through the starting capacitor (8) and the degree of phase shift produced by the starting capacitor (8) are increasingly reduced.